

REMARKS/ARGUMENTS

Claims 18-33 are pending. Claims 1-17 have been canceled.

All claims were rejected for obviousness over Block (4,850,044) in view of Hirabayashi (5,920,664). Block was viewed as disclosing the detection system of the present invention, except that it fails to disclose a sensor connected to the control circuit. Hirabayashi was relied upon as disclosing an x-y position sensor connected to a feedback circuit. The claims were rejected for obviousness because one of ordinary skill in the art would find it obvious to modify Block to include Hirabayashi's position sensor connected to a feedback circuit.

Amongst others, independent claim 18 is limited to detector units which are "arranged adjacent to and in direct contact with each other" Contrary to the assertion in the Office Action that "each logic card (15a-15f) have spaced apart, opposite sides that are arranged adjacent to and in direct contact with each other", Block expressly teaches that the logic cards are not in contact, but spaced apart. In column 5, lines 27-30, Block discloses:

The semiconductor lasers emit radiation which emerges in a diverging beam, and the spacing between logic cards 15a-15f is relatively close, thereby obviating the need for lenses or other optical devices, such as fibers, to convey the radiation from one card to another. (underlining added)

Aside from expressly disclosing that the logic cards are spaced apart, and not in direct contact, Fig. 2 of Block discloses precisely the same, all logic cards 15a-15f are shown spaced apart from each other.

Independent claim 18 further requires "respective optical interfaces of adjacent detector units being in direct areal contact with each other" Although not acknowledged in the Final Rejection, there are no optical interfaces in Block which are in direct areal contact with each other, as is immediately apparent from Fig. 2, because the respective logic cards 15a-15f are spaced apart and, therefore, cannot have optical interfaces in direct contact. Additionally, applicant notes, Block nowhere mentions that there are optical interfaces in direct contact with each other.

According to Block, the logic cards 15a-15f are “transmitting through free space without the use of lenses or other optical elements” (abstract, emphasis added). Indeed, Block stresses the benefits of having a spacing between the cards as follows:

The divergent beam also eliminates the need for collimation or adjustment of the position of the logic cards since the logic card guides 12 provide all the positional accuracy which is required. (column 5, lines 35-38)

Still further, claim 18 requires “at least one optical anomaly along the optical connection path ... for coupling light from the light transmitter into the optical connection path and for coupling light out of the optical connection path to the light receiver” As is illustrated in Fig. 2 of the present application, the optical anomalies incorporated in the individual detector units couple light from light transmitter 23 into the optical connection path 15 and direct (or couple, in the terminology of the claims) returned light out of the optical connection path to light receiver 25. In this manner, the light receivers can be arranged outside the optical connection path, a single connection path can be used for outgoing and incoming light, and the light transmitter and receiver can be mounted within the detector unit, all as illustrated in Fig. 2 of the present application.

Contrary to the assertion in the Final Rejection, Block does not disclose an “optical anomaly (26, 27) along the optical connection path of the logic card (15a-15f) for coupling light from the light transmitters ... into the optical connection path and for coupling light out of the optical connection path to the light receivers”. As is clearly shown in Fig. 2 of Block, the light transmitters/lasers 23a-f and the associated photodetectors 20a-f are in line with the upper optical path illustrated in Fig. 2. Block describes the function and installation of mirrors 26 and 27, which were asserted to constitute an “optical anomaly”, as follows:

With reference to FIG. 2, the laser 23a and PIN diode 22a, mounted on the second side of logic card 15a are optically connected by means of mirrors 26 and 27. These mirrors are positioned to reflect the radiation emitted by laser 23a so that it impinges on PIN diode 22a. (column 5, lines 41-46).

At all times, all semiconductor lasers 23a-f, PIN diode photodetectors 20a-f, semiconductor lasers 23a-f, and PIN diode photodetectors 22a-f are in line with the optical path. Mirrors 26, 27 merely turn around the optical path at the end of the housing.

Thus, Block does not have, does not disclose, and nowhere hints at an arrangement in which a light anomaly along the optical connection path couples light or directs light from the light transmitter to the path and, conversely, couples or directs light from the optical path to the light receiver.

Thus, Block does not disclose or in any form suggest to provide an optical anomaly along the optical connection path as recited in independent claim 18.

Claim 1 also requires an “optical connection path terminating in first and second optical interfaces at opposite sides”. Contrary to the assertion in the Final Rejection that it does, Block does not disclose or suggest such an optical path.

As is shown in Fig. 2 of Block, the logic cards 15a-15f are spaced apart, and there are no “optical interfaces” on the cards. Instead, along the optical axes of Block illustrated in Fig. 2, each card has a semiconductor laser on one side and a PIN diode on the other side of the optical path through the respective logic cards. These are active optical elements which emit/receive light and are not optical interfaces.

Accordingly, Block does not disclose or in any form suggest to provide an optical path through each detector unit which terminates in first and second optical interfaces.

In relation to the present invention as defined by independent claim 18, Block therefore fails to disclose or in any manner suggest:

- adjacent directors which are in direct contact with each other
- optical interfaces on adjacent detectors which are in direct areal contact with each other
- an optical anomaly along the optical connection path which couples light from the light transmitter into the connection path and couples light from the optical connection path to the light receiver

- an optical connection path which terminates in first and second interfaces at opposite sides.

For purposes of the present invention as defined by the claims, Hirabayashi does not provide what is missing from Block.

Hirabayashi does not disclose or suggest detector units which are in direct contact with each other, optical interfaces on the detectors which are in direct areal contact with each other, at least one optical anomaly along the optical path for coupling the light transmitter and light receiver, respectively, with the optical path, or an optical path through each detector unit which ends in optical interfaces. Hirabayashi was not cited as and was not relied upon as disclosing these features of claim 1 which are entirely absent from Block.

These features of the present invention, which are not disclosed or suggested by Block and Hirabayashi, are important features that permit each detector unit to directly optically communicate with any other detector unit via the optical connection path without substantial delay or signal loss.

Accordingly, Block and Hirabayashi do not suggest to one of ordinary skill in the art to modify Block to include detectors units (or logic cards) that are in direct contact, that have optical interfaces in direct areal contact, that provide at least one optical anomaly in the optical connection path for coupling the light transmitter and the light receiver, and each of which has an optical path that terminates in respective interfaces. Claim 18 is therefore not obvious over Block in view of Hirabayashi.

Dependent claims 19-33 are directed to specific features of the present invention which are independently patentable. These claims are further allowable because they depend from allowable parent claim 18.

In view thereof, applicant submits that this application is in condition for allowance, and a corresponding notification at an early date is requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at (415) 576-0200.

Respectfully submitted,


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